WHAT IS CLAIMED IS:

1. A method of manufacturing a synthetic partitiviral satellite particle, comprising combining a recombinant single-stranded RNA (ssRNA) molecule with a viral capsid protein, wherein the recombinant ssRNA molecule comprises from 5’ terminus to 3’ terminus:

(a) a 5’ RNA replication element recognized by a partitiviral RNA-dependent RNA polymerase (RDRP), wherein the 5’ RNA replication element comprises at least a segment of the 5’ untranslated region (UTR) of the partitiviral genome or a variant thereof having one or more nucleotide substitutions, insertions, and/or deletions;

(b) a cargo RNA molecule;

(c) a 3’ RNA replication element recognized by the RDRP, wherein the 3’ RNA replication element comprises at least a segment of the 3’ untranslated region (UTR) of the partitiviral genome or a variant thereof having one or more nucleotide substitutions, insertions, and/or deletions;
wherein the 5’ RNA replication element, the cargo RNA molecule, and the 3’ RNA replication element are operably linked and wherein the cargo RNA molecule is heterologous to the 5’ RNA replication element and the 3’ RNA replication element; and an encapsidation recognition element (ERE), and wherein the ERE provides for encapsidation of the ssRNA by the viral capsid protein.

2. The method of claim 1, wherein the recombinant ssRNA molecule is combined with a viral capsid protein in a vessel.

3. The method of claim 1, wherein the combining comprises

(a) providing to a plant cell the recombinant ssRNA molecule, wherein the plant cell comprises (a) the partitiviral RDRP protein that recognizes the 5’ RNA replication element and 3’ RNA replication element and catalyzes synthesis of a synthetic partitiviral satellite RNA from the recombinant ssRNA molecule; and (b) the viral capsid protein, wherein the viral capsid protein encapsidates the synthetic partitiviral satellite RNA to form a synthetic partitiviral satellite particle; and, optionally

(b) isolating the synthetic partitiviral satellite particle from the plant cell, a plant comprising the plant cell, or from media in which the plant cell or the plant had been grown.

4. The method of claim 1, further comprising the step of formulating the synthetic partitiviral satellite particle wherein the formulating comprises combining the synthetic partitiviral satellite particle with a carrier, an excipient, and/or an adjuvant.

5. The method of any one of claims 1-4, wherein:

(a) the 5’ RNA replication element comprises at least one RNA secondary structure adopted by an RNA molecule encoded by SEQ ID NO: 372, 376, 1-34, 69-87, or 88, 374, 378, 380, 382, or 386; and/or

(b) the 3’ RNA replication element comprises at least one RNA secondary structure adopted by an RNA molecule encoded by SEQ ID NO: 373, 377, 35-68, 89-107, or 108, 375, 379, 381, 383, or 387.

6. The method of any one of claims 1-4, wherein:

(a) the 5’ RNA replication element comprises an RNA molecule encoded by SEQ ID NO: 372, 376, 1-34, 69-87, or 88, 374, 378, 380, 382, or 386; a variant thereof encoded by a DNA molecule having at least 70%, 75%, 80%, 85%, 90%, 95%, 98%, or 99% sequence identity to SEQ ID NO: 372, 376, 1-34, 69-87, or 88, 374, 378, 380, 382, or 386; or a variant thereof wherein one or more nucleotides in the RNA secondary structure are substituted with distinct nucleotides which maintain the RNA secondary structure; and/or

(b) the 3’ RNA replication element comprises an RNA molecule encoded by SEQ ID NO: 373, 377, 35-68, 89-107, or 108, 375, 379, 381, 383, or 387; a variant thereof encoded by a DNA molecule having at least 70%, 75%, 80%, 85%, 90%, 95%, 98%, or 99% sequence identity to SEQ ID NO: 373, 377, 35-68, 89-107, or 108, 375, 379, 381, 383, or 387; or a variant thereof wherein one of more base-paired residues in the RNA secondary structure are substituted with distinct nucleotides which maintain the RNA secondary structure.

7. The method of claim 6, wherein the RNA secondary structure is maintained by substituting nucleotides in the secondary structure which are not base paired with nucleotides which will not base pair and/or by substituting nucleotides in the secondary structure which are base paired with nucleotides which will base pair.

8. The method of any one of claims 1-4, wherein:

(a) wherein the 5’ replicase replication element further comprises a genomic sequence of the partitivirus that is natively located 3’ to and adjacent to the 5’ UTR sequence; and/or

(b) wherein the 3’ replicase replication element further comprises a genomic sequence of the partitivirus that is natively located 5’ to and adjacent to the 3’ UTR sequence, and optionally wherein the partitiviral genome of (a) and (b) are the same.

9. The method of any one of claims 1-4, wherein the ssRNA molecule further comprises at least one of: (i) a tRNA-like element, optionally wherein the tRNA-like element provides for intercellular movement of the RNA and optionally wherein the intercellular movement is mediated by a viral movement protein (MP); (ii) an RNA effecter; and/or (iii) RNA encoding a viral movement protein (MP), optionally wherein an internal ribosome entry site (IRES) is operably linked to the RNA encoding the MP.

10. The method of claim 9, wherein the tRNA-like element comprises a tRNA-like molecule from an *Arabidopsis* FT mRNA or is a tRNA-like sequence selected from SEQ ID NOs: 249, or 184 – 231 or is a modified tRNA-like sequence that has at least 90% sequence identity to a scaffold tRNA-like sequence selected from the group consisting of SEQ ID NOs:184 – 231 and that maintains the secondary structure of the scaffold tRNA-like sequence.

11. The method of any one of claims 1-4, wherein the ERE is a tobacco mosaic virus (TMV) OAS.

12. The method of any one of claims 1-4, wherein the cargo RNA molecule is up to about 3.2kb in length, optionally wherein the cargo RNA molecule comprises: (a) at least one coding sequence, optionally wherein the coding sequence encodes a selectable or scoreable marker; (b) at least one non-coding sequence; or (c) both at least one coding sequence and at least one non-coding sequence.

13. The method of claim 12, wherein the cargo RNA molecule comprises at least one coding sequence, and wherein the RNA molecule further comprises an internal ribosome entry site (IRES) which is operably linked to at least one coding sequence, optionally wherein the operably linked IRES is located 5’ and immediately adjacent to the coding sequence.

14. The method of claim 12, wherein the cargo RNA molecule comprises at least one non-coding sequence, and wherein the at least one non-coding sequence is a hairpin RNA (hpRNA); an RNA that forms multiple stem-loops; an RNA pseudoknot; an RNA molecule that forms at least partially double-stranded RNA; a small interfering RNA (siRNA) or siRNA precursor; a microRNA (miRNA) or miRNA precursor; a phased RNA or phased RNA precursor; a ribozyme; a ligand-responsive ribozyme (aptazyme); an RNA aptamer; or a long noncoding RNA (lncRNA).

15. The method of any one of claims 1-4, further comprising: (i) an RNA comprising at least one ribozyme, optionally wherein the at least one ribozyme is located 5’ to the 5’ RNA replication element or 3’ to the 3’ RNA replication element; or (ii) an RNA molecule comprising at least one ligand-responsive ribozyme (aptazyme), optionally wherein the at least one ligand-responsive ribozyme is located 5’ to the 5’ RNA replication element or 3’ to the 3’ RNA replication element.

16. The method of any one of claims 1-4, wherein: (i) the 5’ RNA replication element and the 3’ RNA replication element are obtained from the same partitiviral genome or from related partitiviral genomes having at least 85%, 90%, 95%, 98%, or 99% sequence identity to one another; (ii) the 5’ RNA replication element, the 3’ RNA replication element, and the RDRP are obtained from the same partitiviral genome or from related partitiviral genomes having at least 85%, 90%, 95%, 98%, or 99%

sequence identity to one another; or (iii) wherein the 5’ RNA replication element, the 3’ RNA replication element, and/or the RDRP coding region are obtained from two partitiviral genomes wherein the members of each pair of the 5’ RNA replication elements, 3’ RNA replication elements, and/or RDRP coding region have at least 85%, 90%, 95%, 98%, or 99% sequence identity to one another.

17. The method of any one of claims 1-4, wherein the recombinant RNA molecule is encapsidated by a viral capsid protein, wherein the viral capsid protein is a partitiviral capsid protein, and wherein the ssRNA comprises an ERE which provides for encapsidation of the ssRNA by the partitiviral capsid protein.